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(54) **TEXTILE BAND FOR SOLAR PROTECTION ELEMENT**

(57) The present invention falls within the textiles sector, specifically the technical textiles sector.

Textile strip for a protection or covering element consisting of a woven fabric, which is produced by perpendicularly crossing threads which extend in a longitudinal or warp direction and threads which extend in a transverse or weft direction, said textile strip being characterised in that it comprises core-spun threads having a core of elastomeric fibres having viscoelastic properties.

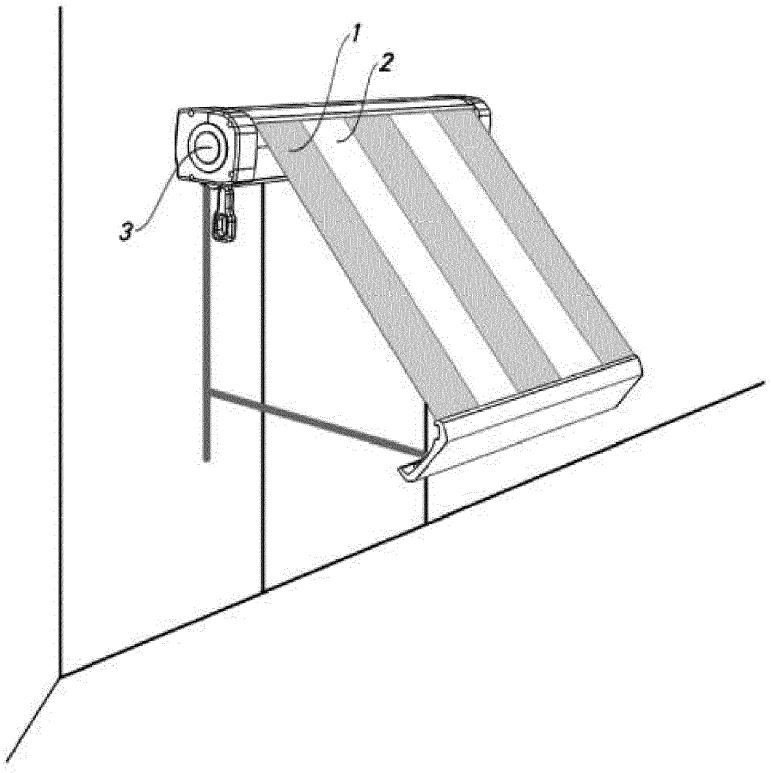

Fig.1

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Description

[0001] The present invention falls within the textiles sector, specifically the technical textiles sector.

[0002] In the present invention, the term "textile element" or "textile band" is used to refer to woven fabrics, that is, obtained by perpendicularly crossing threads which extend in a longitudinal direction (warp) and threads which extend in a transverse direction (weft). Said textile elements are usually produced in rectangular pieces or strips, the dimensions of which are given by the width, length and thickness thereof. The width of the strips is constrained by the physical limitations of the loom, which is why the length of the textile element is usually considerably greater than the width.

[0003] In the present invention, the term "protection element" or "covering element" is used to refer to textiles elements of which the purpose is to protect objects and/or areas from atmospheric agents such as rain, dust, solar radiation, etc. Said protection elements are commonly referred to as canvases or awnings, among others. During the manufacturing process of said covering elements, one or more folds of the longitudinal ends of the textile element are carried out; said folds, commonly known as hems, are intended to prevent the element from fraying. Producing folds of this kind in the textile element during the manufacture of protection elements results in regions having a greater thickness, that is, the regions of the protection element which are folded have a greater thickness than non-folded regions.

[0004] As mentioned previously, the textile elements are usually produced having width dimensions that are constrained by the physical limitations of the manufacturing process. For this reason, during the manufacture of covering elements that can cover areas that are larger than the width of the textile element, the various elements or textile strips must be joined together. Said joining is achieved by partially overlapping the longitudinal ends of two contiguous textile strips and then attaching said strips by permanent attachment means such as stitching or welding, among others. As a result of overlapping the two textile elements, regions having a greater thickness are produced in the protection element, that is, the regions of the protection element in which two or more textile strips overlap have a greater thickness than that of regions in which strips do not overlap.

[0005] The protection elements of the present invention are usually rolled up and unrolled. For example, the protection element can be unrolled for protection against rain or solar radiation, and can be rolled up in high winds in order to protect it from excessive stress, which could lead to it breaking or to the structure holding it to break. As explained earlier, the protection elements, as a result of the manufacturing process thereof, have regions of differing thickness. Owing to this difference in thickness of the protection element, when said protection element is in the rolled-up position, the regions thereof having a greater thickness provide a diameter that is significantly larger than that of the regions of the element having a lesser thickness. For this reason, the threads of the regions of lesser thickness are subjected to a constant tensile force when the protection element is in the rolled-up position. Said tensile force causes permanent deformations in the protection element, for example creases and/or pockets that are visible when the protection element is in the unrolled position. This effect is produced after a very short period of time of using the protection element, has a negative impact on the appearance of the protection element and may accelerate the deterioration of same.

[0006] In order to prevent the formation of said permanent deformations, document ES2361564A1 discloses a self-tensioning textile protection element formed of strips of fabric composed of threads having resilient properties. However, the textile element disclosed in said document does not prevent the emergence of permanent deformations in an entirely satisfactory manner throughout the entire period in which the protection element is used.

[0007] In the present invention, the term "threads of the core-spun type" or "core-spun threads" is used to refer to threads which comprise a core and a sheath. The core of the core-spun threads is formed of one or a plurality of threads. On the other hand, the sheath is formed of fibres that cover the core of the core-spun threads. As is known in the prior art, the core and sheath of the core-spun threads may be made of the same or different materials. Furthermore, the filaments that make up the core and/or sheath of the core-spun threads may be resilient, rigid, semi-rigid, among others.

[0008] The inventors of the present invention, after rigorous experiments, have developed a textile element which makes it possible to overcome the problems of the textile elements known in the prior art and which is remarkable in that it is better able to prevent the formation of creases than that which is known in the prior art. In particular, the present invention discloses a textile strip for protection or covering elements consisting of a woven fabric, produced by perpendicularly crossing threads which extend in the longitudinal or warp direction and threads which extend in the transverse or weft direction, and comprises core-spun threads comprising a core of elastomeric fibres having viscoelastic properties.

[0009] Therefore, the present invention is based on the use of textile strips formed of threads comprising elastomeric fibres. Said elastomeric fibres are characterised in that they have viscoelastic properties. Unlike materials having purely resilient properties, materials having viscoelastic properties provide time-dependent deformation. The viscoelasticity results from molecular reorganisation of the material, specifically from the reorganisation of polymer chains that make up the elastomer in a phenomenon known as "creep". When a viscoelastic material is subjected to stress, creep occurs and the material creeps until it adapts to the new state of equilibrium. When the initial stress exerted on the material ceases, the material returns to its original shape. Said viscoelastic properties inherent to the elastomeric fibres of the present invention are the reason for the improved ability of the textile element of the present invention to prevent the emergence of creases and/or permanent deformations.

[0010] In a preferred embodiment, said textile strip comprises core-spun threads comprising crimped elastomeric fibres having viscoelastic properties.

[0011] In a preferred embodiment, said core-spun threads comprise a sheath of acrylic fibres. In another preferred embodiment, said acrylic fibres are acrylic staple fibres. In another preferred embodiment, said acrylic fibres are wet-spun. In another preferred embodiment, said acrylic fibres are dope-dyed.

[0012] In a preferred embodiment, the core-spun threads have a yarn count in metric count (Nm) of between 10 and 25.

[0013] In a preferred embodiment, said textile strip is characterised in that the material of the core-spun threads is such that the elastic recovery of the textile strip is greater than 99%.

[0014] In a preferred embodiment, said textile strip is characterised in that said elastomeric fibres are made of an elastomer that is highly resistant to UV rays.

[0015] In a preferred embodiment, said textile strip is characterised in that the weft is formed of said core-spun threads having a core comprising said elastomeric fibres.

[0016] In a preferred embodiment, said textile strip is comprised in a protection or covering element and comprises a region of overlapping fabric which is attached by permanent attachment means such as stitching, welding, staples or adhesive, among others. In another preferred embodiment, said overlap region joins said strip to another textile strip. In another preferred embodiment, said threads having a core of elastomeric fibres are arranged perpendicularly to the region of overlapping fabric.

[0017] The present invention is described below with reference to the following figures, which do not limit the scope of the present invention and in which:

Fig. 1 shows an embodiment of the textile protection element used as a roller awning.

Fig. 2 is a schematic plan view of a fragment of the textile protection element produced by joining two textile strips, specifically the region where two textile strips overlap is shown.

Fig. 3 is a schematic view of an embodiment of a core-spun thread.

Fig. 4 is a graph showing stretch under a constant load and elastic recovery of a textile strip composed of core-spun threads having a core of elastomeric fibres.

[0018] As shown in Fig. 1, the textile element of the present invention can be used as an awning. Said awning is formed by joining the textile strips -1-, -2-, etc. When the awning is to be stowed, it is rolled up around the cylinder -3- by the rotary action of said cylinder.

[0019] As shown in Fig. 2, the textile strips -1- and -2- are joined by partially overlapping the respective longitudinal ends -4- and -5- thereof, creating an overlap region -6- which extends in parallel with the central longitudinal axis -7-. In the region -6-, permanent attachment means, such as stitching or welding, among others, are used. Because the protection element is thicker in the region -6-, when said element is rolled up, stresses are produced which lead to the appearance of creases -8-, -9-, which are visible in the unrolled position of the protection element.

[0020] As shown in Fig. 3, the core-spun threads which make up the textile element comprise a core -10- and a sheath -11-. The core -10- comprises a plurality of elastomeric fibres, while the sheath -11-, which covers the core, comprises a plurality of acrylic fibres.

[0021] As shown in Fig. 4, the graph shows the stretch under a constant load and the elastic recovery of a textile strip composed of core-spun threads having a core of elastomeric fibres. The timescale is shown on the x-axis, while the percentage of stretch of the strip is shown on the y-axis, which percentage of stretch is calculated using the formula:

$$\% \text{ stretch} = [(\text{final length} - \text{initial length})/\text{initial length}] \times 100$$

[0022] At the starting time -12-, an extension force is exerted on the textile strip such that instantaneous initial stretching of said strip is produced. After the starting time -12-, the strip is stretched under a constant load, said stretching under a constant load increasing until it reaches a constant value at the time point -13-. At said time point -13-, the extension force ceases to be exerted on the textile strip, such that from the time point -13-, the elastic recovery of the strip begins. During elastic recovery, the stretch decreases with time until maximum elastic recovery -14-, of more than 99%, is reached.

[0023] Although the invention has been described with respect to preferred embodiments thereof, these should not be considered to limit the invention, which will be defined by the broadest interpretation of the following claims.

Claims

1. Textile strip for a protection or covering element consisting of a woven fabric, which is produced by perpendicularly crossing threads which extend in a longitudinal or warp direction and threads which extend in a transverse or weft direction, said textile strip being **characterised in that** it comprises core-spun threads having a core of elastomeric fibres having viscoelastic properties.

2. Strip according to the preceding claim, **characterised in that** said elastomeric fibres are crimped.

3. Strip according to either of the preceding claims, **characterised in that** the core-spun threads comprise a sheath of acrylic fibres.

4. Strip according to claim 3, **characterised in that** the acrylic fibres are acrylic staple fibres.

5. Strip according to either of claims 3 and 4, **characterised in that** the acrylic fibres are wet-spun.

6. Strip according to any one of claims 3 to 5, **characterised in that** the acrylic fibres are dope-dyed.

7. Strip according to any one of the preceding claims, **characterised in that** the core-spun threads have a yarn count in metric count (Nm) of between 10 and 25.

8. Strip according to any one of the preceding claims, **characterised in that** the material of the core-spun threads is such that the elastic recovery of the textile strip is greater than 99%.

9. Strip according to any one of the preceding claims, **characterised in that** said elastomeric fibres are made of an elastomer that is highly resistant to UV rays.

10. Strip according to any one of the preceding claims, **characterised in that** the weft is formed of said core-spun threads having a core comprising said elastomeric fibres.

11. Strip according to any one of the preceding claims, **characterised in that** it is comprised in a protection or covering element and comprises a region of overlapping fabric which is attached by permanent attachment means such as stitching, welding, staples or adhesive, among others.

12. Strip according to claim 11, **characterised in that** said overlap region joins said strip to another textile strip.

13. Strip according to any either of claims 11 and 12, **characterised in that** said threads having a core of elastomeric fibres are arranged perpendicularly to the region of overlapping fabric.

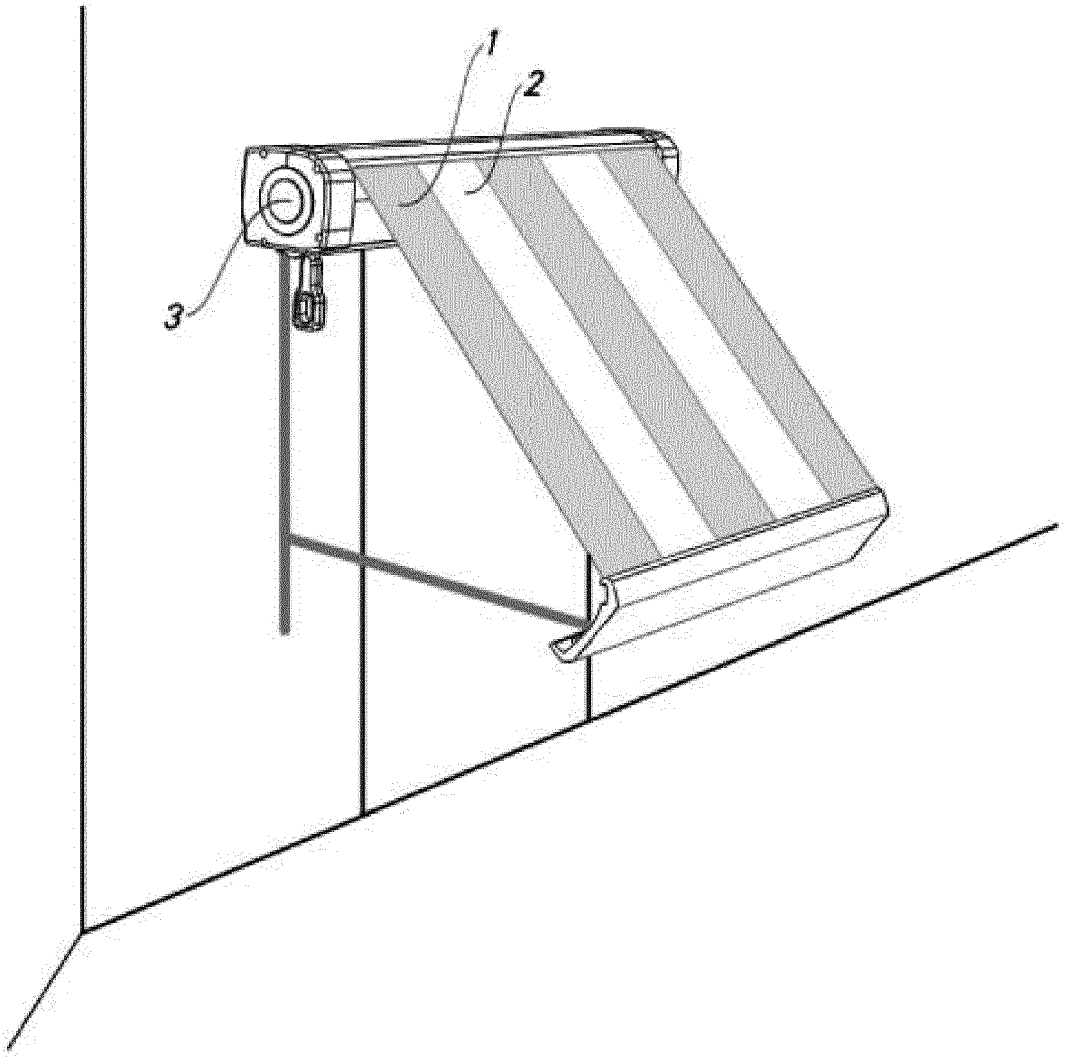

Fig.1

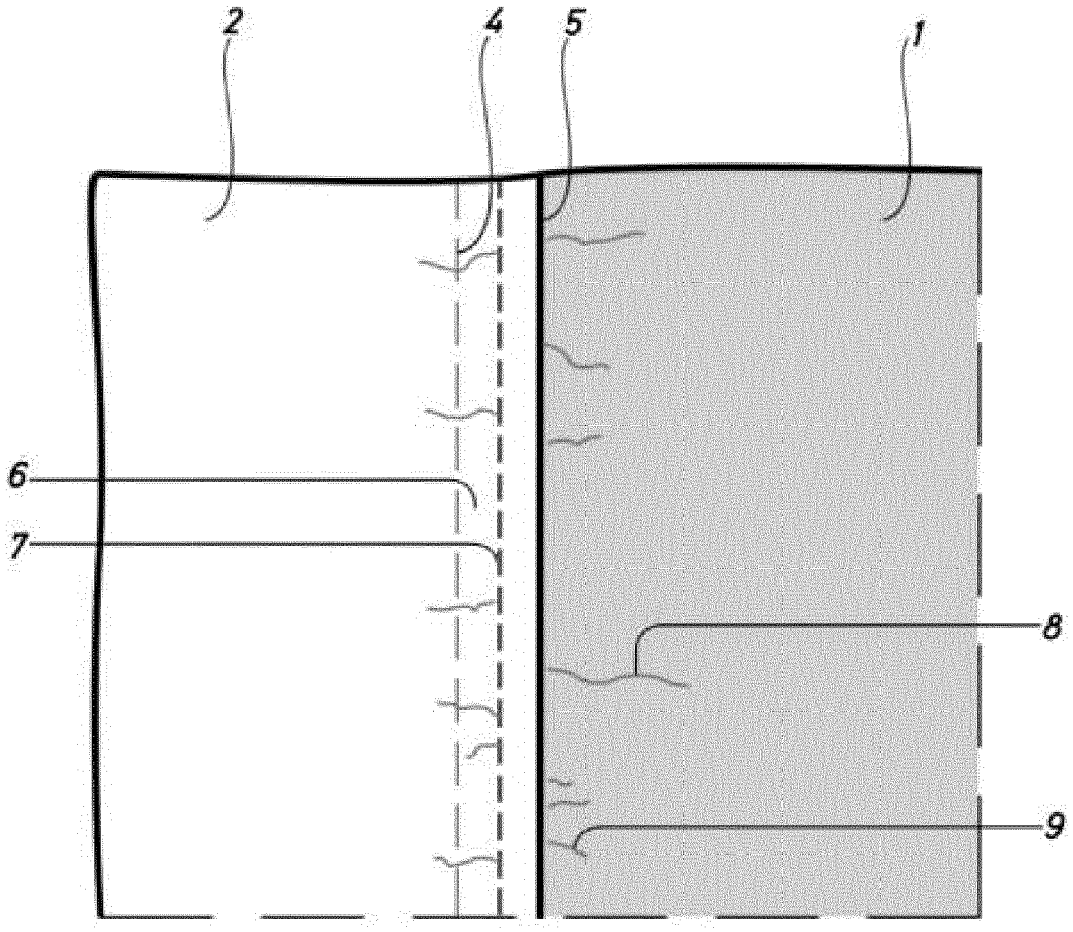

Fig.2

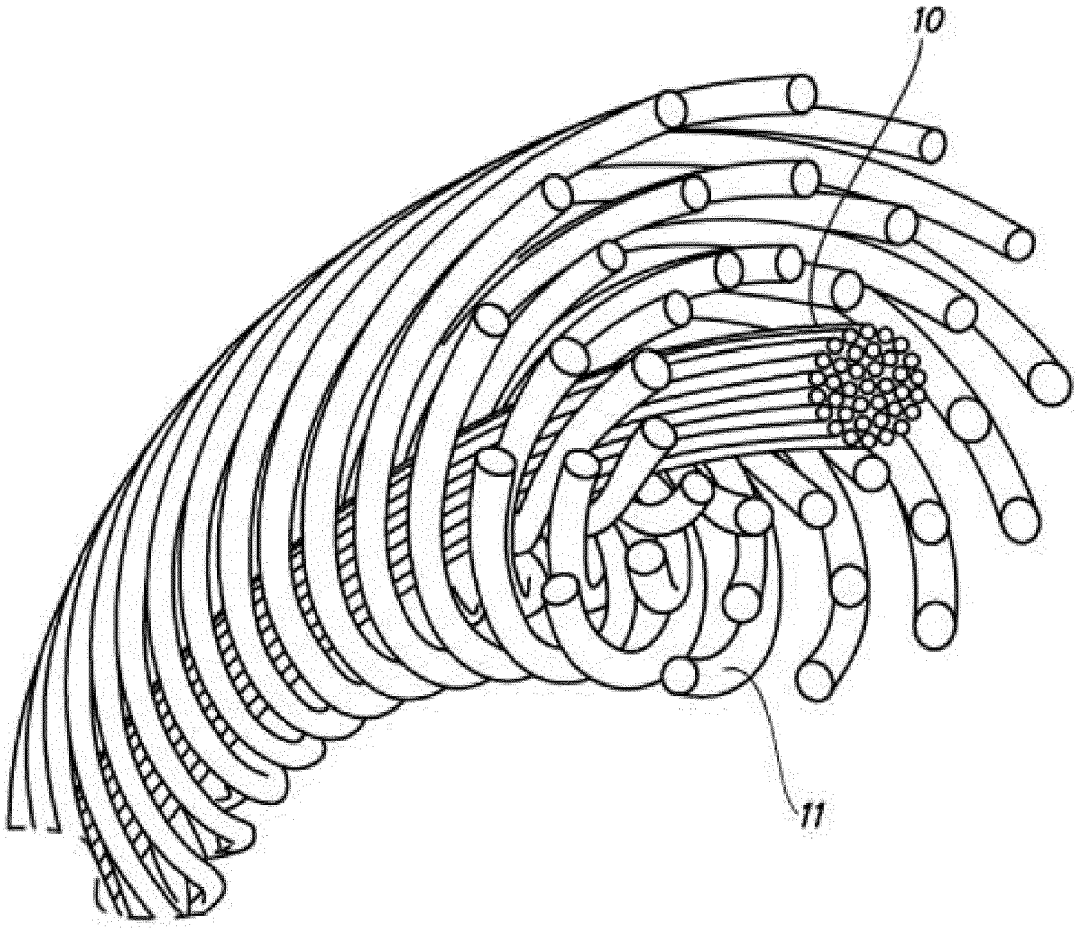

Fig.3

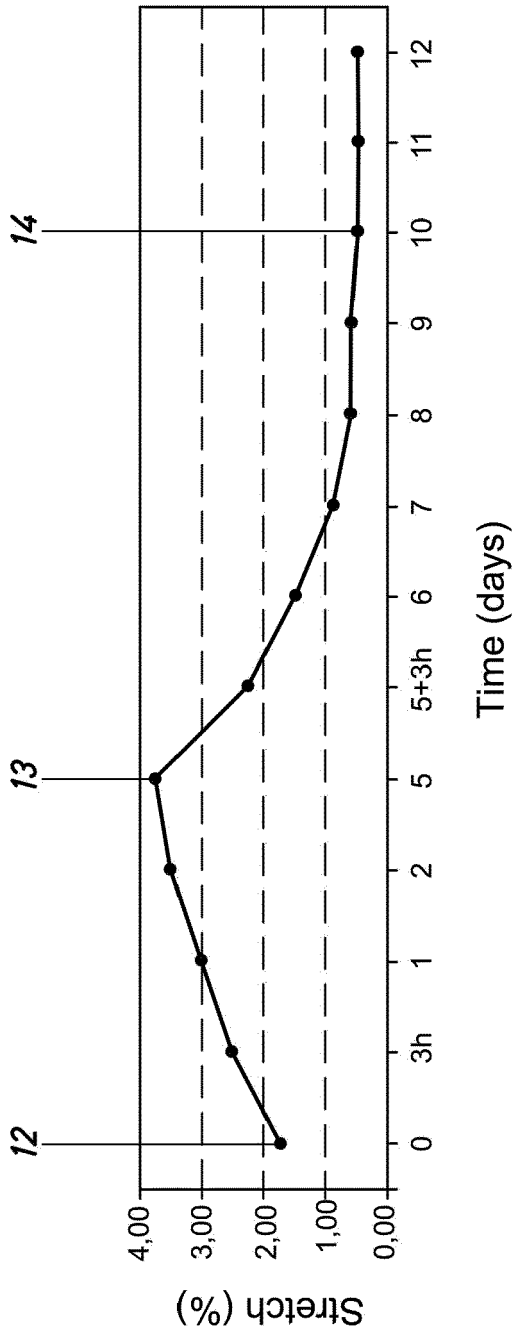
12
13
14
Stretch (%)
4,00
3,00
2,00
1,00
0,00
0
3h
1
2
5
5+3h
6
7
8
9
10
11
12
Time (days)

Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2707

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 March 2018	Heinzelmann, Eric

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2707

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 March 2018	Heinzelmann, Eric

CATEGORY OF CITED DOCUMENTS

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REFERENCES CITED IN THE DESCRIPTION

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